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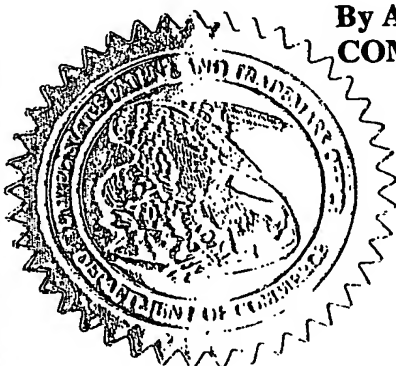
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APPLICATION NUMBER: 60/461,392

FILING DATE: April 08, 2003

RELATED PCT APPLICATION NUMBER: PCT/US04/11054

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<input type="checkbox"/> Additional inventors are being named on the _____ separately numbered sheets attached hereto		
TITLE OF THE INVENTION (500 characters max)		
SYSTEM FOR REPLACEMENT OF SHEET ABRASIVE		
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<input checked="" type="checkbox"/> Customer Number OR <input type="checkbox"/> Firm or Individual Name	CORRESPONDENCE ADDRESS  Type Customer Number Bar here 28020 Peter Forrest Gray, Plant, Mooty, Mooty & Bennett, PA P.O. Box 2906 Minneapolis MN 55402-0906 USA Telephone 612-343-3981 Fax 612-333-0066	
ENCLOSED APPLICATION PARTS (check all that apply)		
<input checked="" type="checkbox"/> Specification Number of Pages 8 <input checked="" type="checkbox"/> Drawing(s) Number of Sheets 5 <input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76 <input type="checkbox"/> CD(s), Number <input type="checkbox"/> Other (specify)		
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Respectfully submitted

SIGNATURE

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Date 04/08/2003

REGISTRATION NO.
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Docket Number:

33,235

93109-PRV

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April 8, 2003

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In re application of: Anderson, Thomas
Mailed: April 8, 2003
Title: **SYSTEM FOR REPLACEMENT OF SHEET ABRASIVE**
Attorney Docket No.: 93109-PRV

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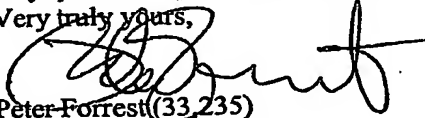
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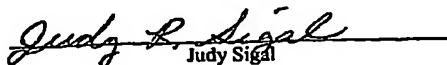
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Judy Sigal

Enclosures/GP:1446641 v1

Provisional Patent Application
Attorney Docket No. 93109-PRV

SYSTEM FOR REPLACEMENT OF SHEET ABRASIVE

TECHNICAL FIELD

5 This invention relates to systems for rapid replacement of abrasive in machinery which uses the abrasive to finish the surfaces of workpieces that pass through the machinery on a belt, such as so-called widebelt sanders.

BACKGROUND

10 The basic features of surface finishing machines of the type that represent the preferred environment for the invention are shown in at least the following US Patents, the entire contents of which are incorporated into reference, and a copy of which is enclosed as if fully set forth in the text of this document: 5,081,794 (Haney); 5,181,342 (Haney); 5,321,913 (Haney); 5,443,414 (Haney); 5,702,287 (Haney); 5,707,273 (Grivna); 4,473,500 (David); 4,837,984 (David); and 4,864,775 (David).

15 Such machines typically use a platen-mounted abrasive element that comprises an abrasive medium itself, *e.g.*, sandpaper, emery cloth, or in general any thin paper-backed or fabric-backed sheet bearing a layer of finely sized abrasive particles, such as sand, ceramic, and the like. A resilient pad on the non-abrasive side of the abrasive material improves performance. Because of the forces created by very rapid motion required so the abrasive
20 material does not leave scratches and other defects in the workpiece to be finished by the equipment, the supporting metal platen may itself be somewhat permanently mounted in the apparatus or not easily removable, depending on the configuration, so that it does not have a significant amount of mechanical play in its mounting subassembly. Thus, typically, replacement of the abrasive material requires removal and reconfiguration of any or all of
25 the entire platen, the resilient material, and the abrasive material itself.

 Thus, some means of removing the abrasive material (with or without the resilient pad accompanying it) must be provided so that the abrasive material may be changed as

required. For example, as disclosed in Figures 5 and 6 and accompanying text of the Haney patents noted above: "An abrasive 152 is secured to the platen around foam 150. Clips 154 are used to secure the abrasive to the platen. Alternatively or additionally, the abrasive may be secured to the foam and platen by an adhesive. 'Secured' means that the abrasive's motion is completely dependent on the platen's motion. Thus, when the platen moves the abrasive also moves. Abrasive 152 and its equivalents may be referred to as abrasive means. The foam is positioned between the platen and the abrasive to provide a soft touch to prevent the abrasive's grit from scratching into a product too deeply. Without the foam, unwanted scratches would result from products that are not perfectly flat. As shown in FIGS. 5 and 6, clips 154 are positioned on both sides of platen 100. A spring-biased rod 160 (shown best in FIGS. 4-6) is used to operate the clips on the back side of the platen. The rod includes a handle 162 and arms 164. When the handle is pushed down, the rod rotates and the arms contact the clips and cause them to open. The rod can then be locked in place by locking mechanism 166. The abrasive is then inserted between the clips and the platen. The clips close when the rod is released. In the preferred embodiment, the rod is secured to brace 70."

SUMMARY OF INVENTION

In one embodiment, the invention is a system for rapid replacement of abrasive in machinery having a non-removable platen. The system employs a set of rails on each side of the platen of the apparatus, which rails are movable apart from or toward each other. The abrasive material is frictionally attached on each edge to mounts that hold their respective edges within themselves. The mounts are shaped and sized to fit within the rails on each side of the platen. Moving the rails farther apart from each other tightens the abrasive material around the working surface of the platen for normal use, while moving the rails closer together loosens the combination of mounts and abrasive material so that they can be removed as a unit from the apparatus. The edges of the abrasive material may be easily removed from the mounts by releasing the frictional attachment, and the mounts used again with a different piece of abrasive material.

In another embodiment, the invention is a mount having means for providing frictional holding of the abrasive material.

In another embodiment, the invention is an abrasive material having integral, permanent mounts on the edges of the abrasive material, so that the entire combination
5 may be supplied or replaced as a unit that fits into the rails of the apparatus.

In another embodiment, the invention is an apparatus that employs a single motor to provide two distinct motions to the platen.

DESCRIPTION OF THE DRAWINGS

Figure 1 shows a side view of a portion of a preferred embodiment of the invention,
10 prior to placement of the abrasive material.

Figure 2 is similar to Figure 1 but includes the abrasive material.

Figure 3 is a close up view of a portion of Figure 2, showing a preferred but not required means for frictionally coupling the abrasive material into the mount.

Figure 4 is a schematic view similar to Figure 3.

Figure 5 is a schematic view illustrating an alternative embodiment to that shown in
15 Figures 2, 3 and 4.

DETAILED DESCRIPTION

Figure 1, shows that platen 100 is constructed so that pad 150 is somewhat permanently mounted to platen 100 by any convenient means. In the preferred embodiment,
20 pad 150 is mounted to a plate 151, which in turn is connected to platen 100 in any conventional manner. Thus, plate 151 may be removed only when it is necessary to replace pad 150, which is not as frequently as it is necessary or desirable to replace the abrasive

material, as described below, and platen 100 need not be removed from the apparatus at all (unless that is the most convenient way to replace pad 150 and plate 151).

Platen 100 further comprises rails 201 and 202 which are moveably and adjustably mounted to the sides of platen 100 so that their lateral position with respect to their
5 respective sides of platen 100 may be adjusted by any convenient means. For example, the piston illustrated as 230 moves rail 202 away from its respective side of platen 100. In this preferred embodiment, other similar pistons (not shown) similarly move rail 201 away from its respective side of platen 100. This is only a preferred embodiment, because the scope of the invention includes any subsystem that moves either or both of rails 201 and 202 with
10 respect to platen 100 (and thus with respect to each other).

Figure 2 is a view similar to Figure 1, but also shows abrasive material 152 suspended between its edges. Figure 2 shows the invention in a position in which the piston 230 has not been used to increase the distance between rails 201 and 202, and thus abrasive material 152 is not yet drawn into a taut position. For purposes of the illustration only, the
15 combination of mounts 210 and 211 and abrasive material 152 is shown partially slid out of working position, towards the viewer (up out of the plane of the figure), but the majority of the length of each mount still lies in its respective rail.

Figure 3 is a close-up view of mount 210. In this preferred embodiment, mount 210 holds the edge of abrasive material 152 in place with a spline 220 that is wedged, along with
20 the edge of abrasive material 152, into a channel 211 formed within mount 210. The size and configuration of both channel 211 and spline 220 are selected so that there is sufficient frictional coupling against the edge of abrasive material 152 to hold that edge in place.

The exact configuration of mount 210 shown in Figure 3 is not a requirement of the invention. Mount 210 may be lightweight extruded aluminum or any other material which
25 serves its intended purpose. In particular, mount 210 could be integrally formed with abrasive material 152 as a single disposable unit instead of being reusable with other pieces of abrasive material 152.

Figure 4 illustrates schematically the general conceptual arrangement of mount 210, spline 220, abrasive material 152, and rail 201, to emphasize that specific features illustrated in the previous figures are not necessarily requirements of the invention. In this regard, Figure 5 shows an alternative embodiment, one which illustrates the more general nature of the invention. In general, all that is required is that the edge of the abrasive material 152 be frictionally secured to mount 210 (when a non-integral mount is employed), and this may not require an inserted spline 220 if the configuration and materials of mount 210 and/or channel 211 are properly designed. For example, a crimp-mounted approach is within the scope of the invention. Channel 211 is shown as within the uppermost portion of mount 210 but this is not a requirement of the invention.

The use of a generally rectangular (in cross-section) mount 210 permits abrasive material 152 to be wrapped around mount 210 without subjecting abrasive material 152 to extreme shear and other tearing forces near the edge of abrasive material 152. Preferred abrasive materials include the so-called "J weight" cloth backed materials, as they are more flexible than "X weight" materials commonly used in the industry. However, other cross-sectional shapes of mount 210 are within the scope of the invention. For example, a generally circular or oval cross-sectional shape could be employed, and a variety of crimp-type features used to hold the edge of the abrasive material in place. The selected shape is may also dictate the cross-sectional configuration, size, or other features of rail 201.

The abrasive material need not necessarily have a constant grit rating throughout the its extent. It is possible to have a dual-value (or, in general, a plurality of values) of grit rating, including a continuously variable grit value, as one considers various locations along the extent of abrasive material 152. For example, as the workpiece moves through the apparatus, it could encounter a course grit first, followed by one or more finer grits before leaving the apparatus. This could be accomplished by varying the grit of the material actually attached to abrasive material 152, or it could be accomplished by assembling abrasive material 152 from two or more pieces of material having different grits, such as by using pressure sensitive or other adhesive to splice or otherwise assemble the pieces together.

The prior art approaches disclosed in the patents above use two separate motors to impart two distinct motions to the platen. In the preferred embodiment, the invention employs a single motor to provide the two distinct motions to the platen.

In cross-sectional view, the mounting of abrasive material 152 appears similar to
5 that shown in US Patent 6,001,004 (Botteghi), assigned on SCM Group, S.p.A. or Rimini, Italy. However, that patent uses a continuous supply of abrasive fed from rollers in a direction transverse to the direction that the workpiece travels. The edges of the abrasive material are not supported in and mount and rail system as described above.

I claim:

1. A system for rapid replacement of abrasive in machinery having a non-removable platen, comprising
 - a set of rails, one on each side of the platen, which rails are movable apart from or toward each other;
 - the abrasive material being frictionally attached on each of its edges to respective mounts that hold their respective edges within themselves;
 - in which the mounts are shaped and sized to fit within the rails on each side of the platen.
2. The system of claim 1, in which moving the rails farther apart from each other tightens the abrasive material around a working surface of the platen for normal use of the apparatus, while moving the rails closer together loosens the combination of mounts and abrasive material so that they can be removed as a unit from the apparatus.
3. The system of claim 1 in which the edges of the abrasive material may be removed from the mounts by releasing the frictional attachment
4. A mount having means for providing frictional holding of the abrasive material as described in claim 1.
5. An abrasive material having integral, permanent mounts on the edges of the abrasive material, so that the entire combination may be supplied or replaced as a unit that fits into the rails of the apparatus as described in claim 1.
6. An apparatus that employs a single motor to provide two distinct motions to the platen.

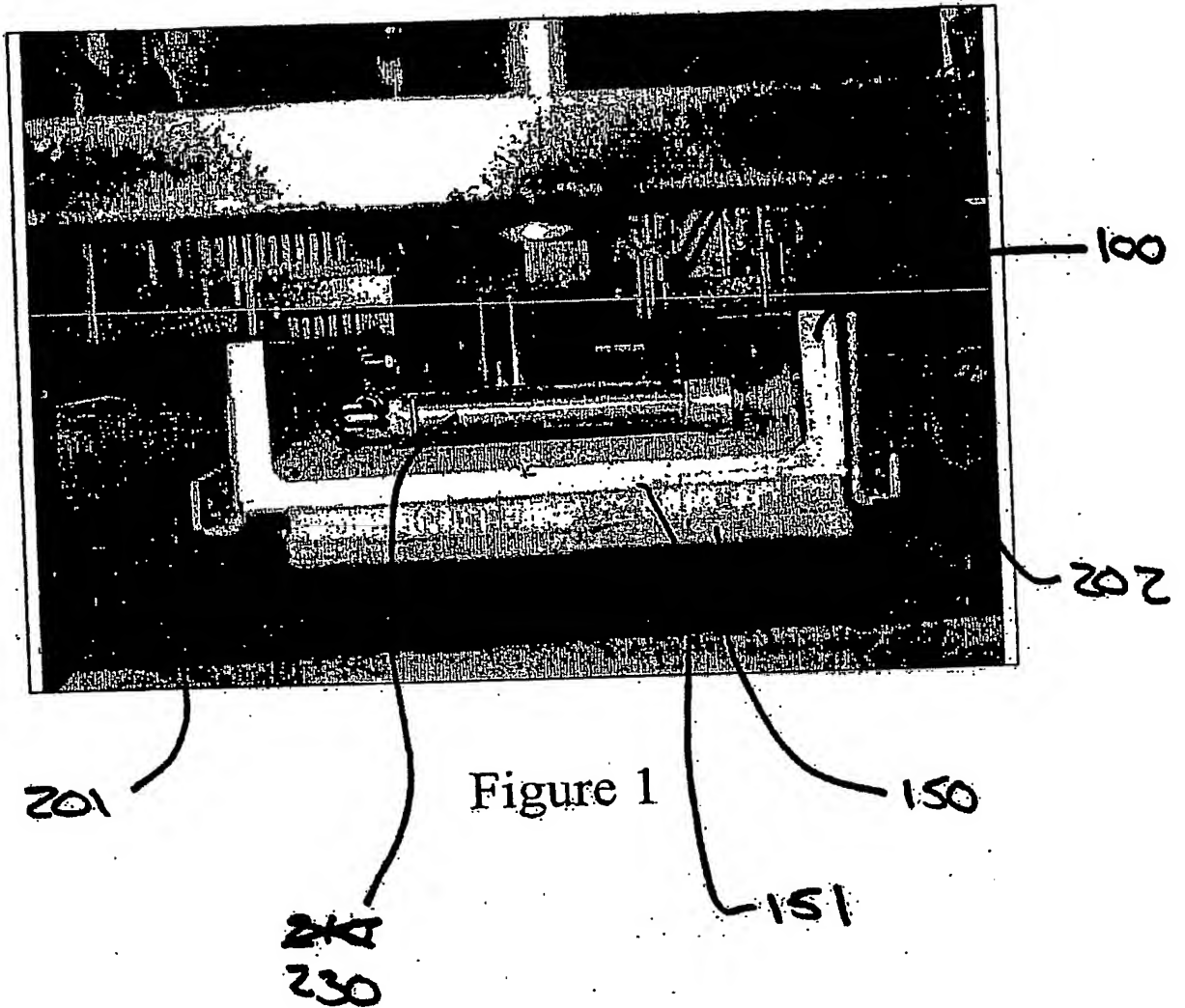
Provisional Patent Application
Attorney Docket No. 93109-PRV

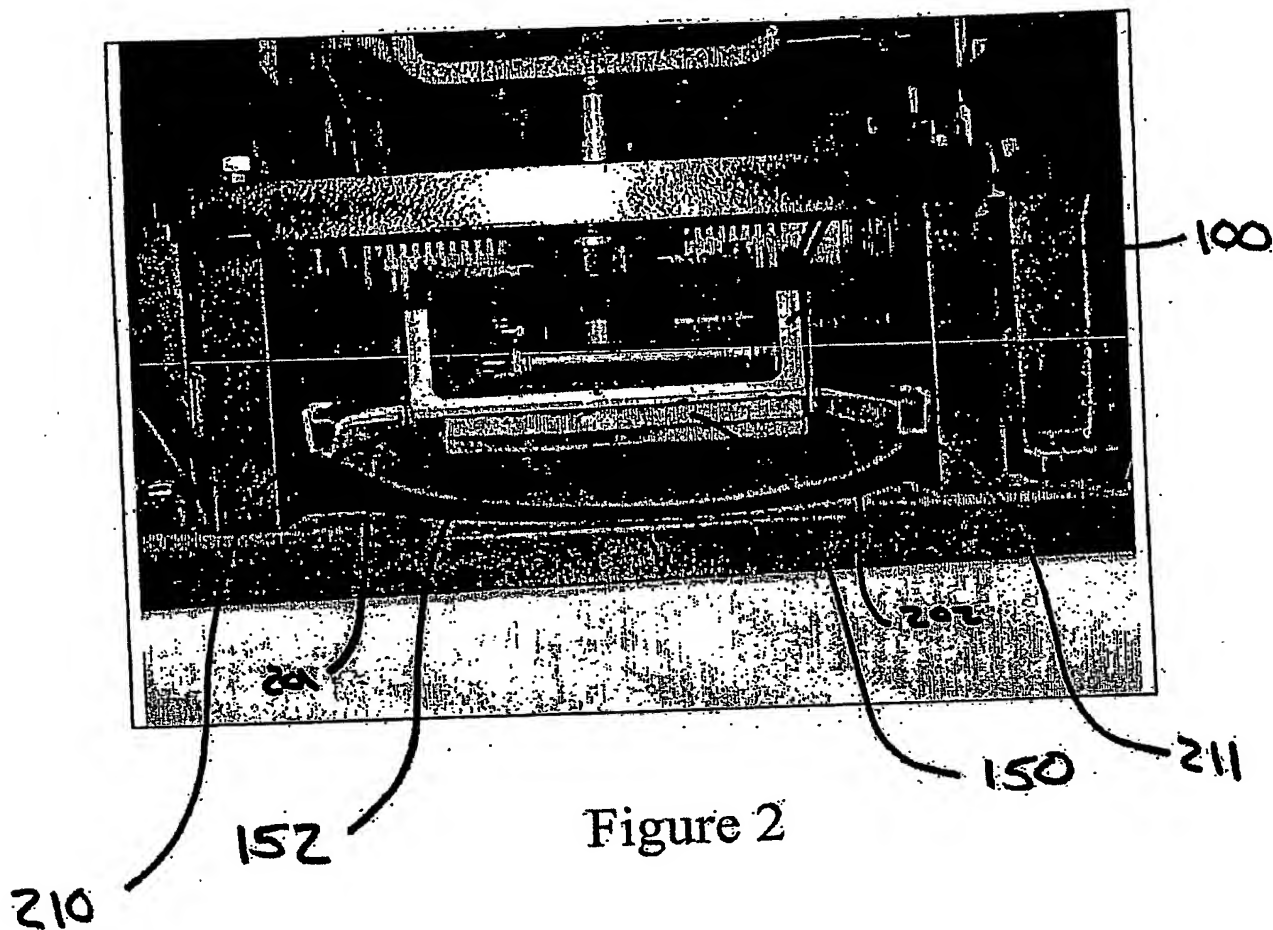
SYSTEM FOR REPLACEMENT OF SHEET ABRASIVE

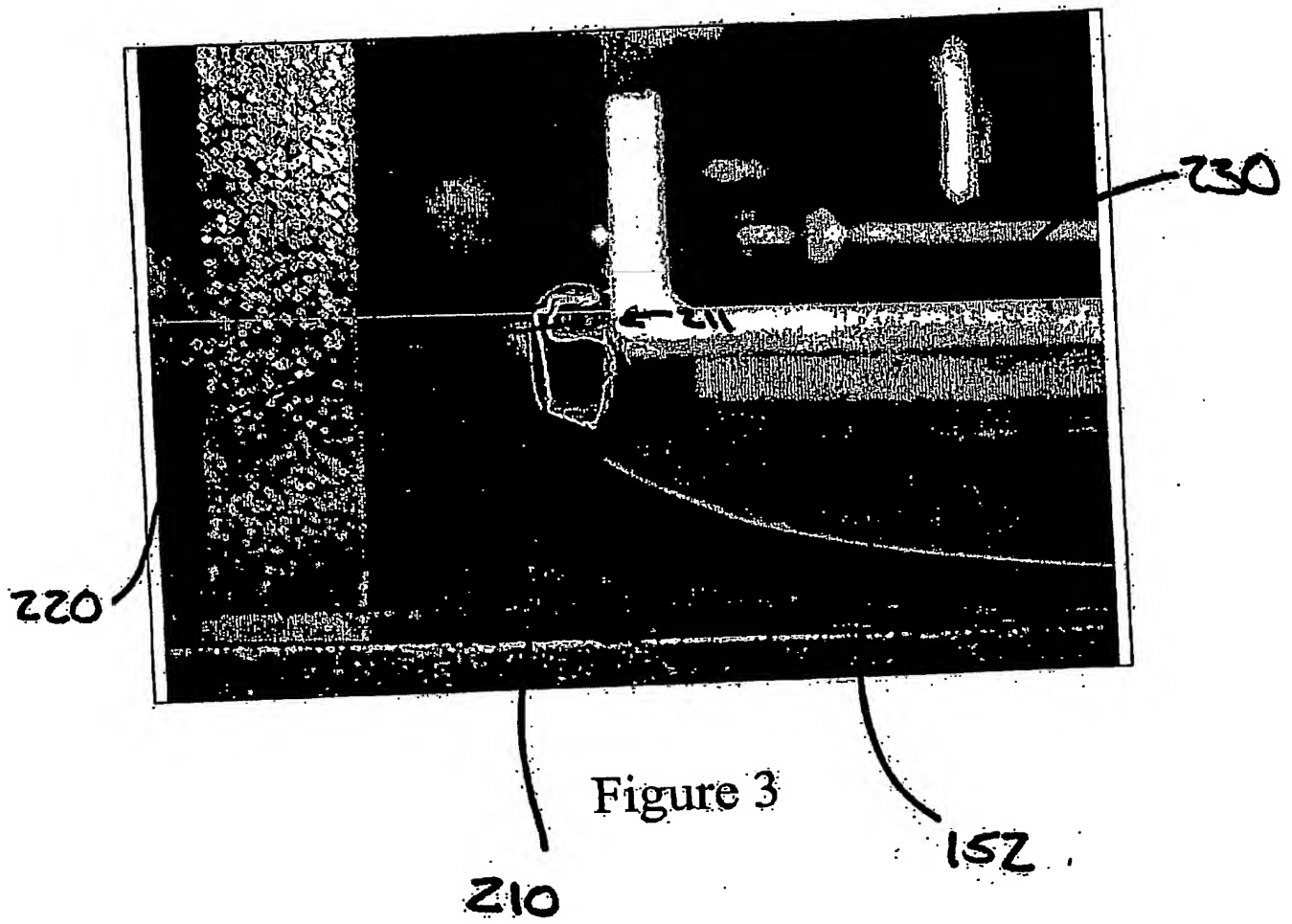
ABSTRACT

- 5 A system for rapid replacement of abrasive in machinery which uses the abrasive to finish the surfaces of workpieces that pass through the machinery on a belt, such as so-called widebelt sanders. The system employs a set of rails on each side of the platen of the apparatus, which rails are movable apart from or toward each other. The abrasive material is frictionally attached on each edge to mounts that hold their respective edges within
- 10 themselves. The mounts are shaped and sized to fit within the rails on each side of the platen. Moving the rails farther apart from each other tightens the abrasive material around the working surface of the platen for normal use, while moving the rails closer together loosens the combination of mounts and abrasive material so that they can be removed as a unit from the apparatus. If desired, the edges of the abrasive material may be easily removed
- 15 from the mounts by releasing the frictional attachment, and the mounts used again with a different piece of abrasive material. In another embodiment, the abrasive material is formed with integral, permanent mounts on the edges of the abrasive material, so that the entire combination may be supplied or replaced as a unit.

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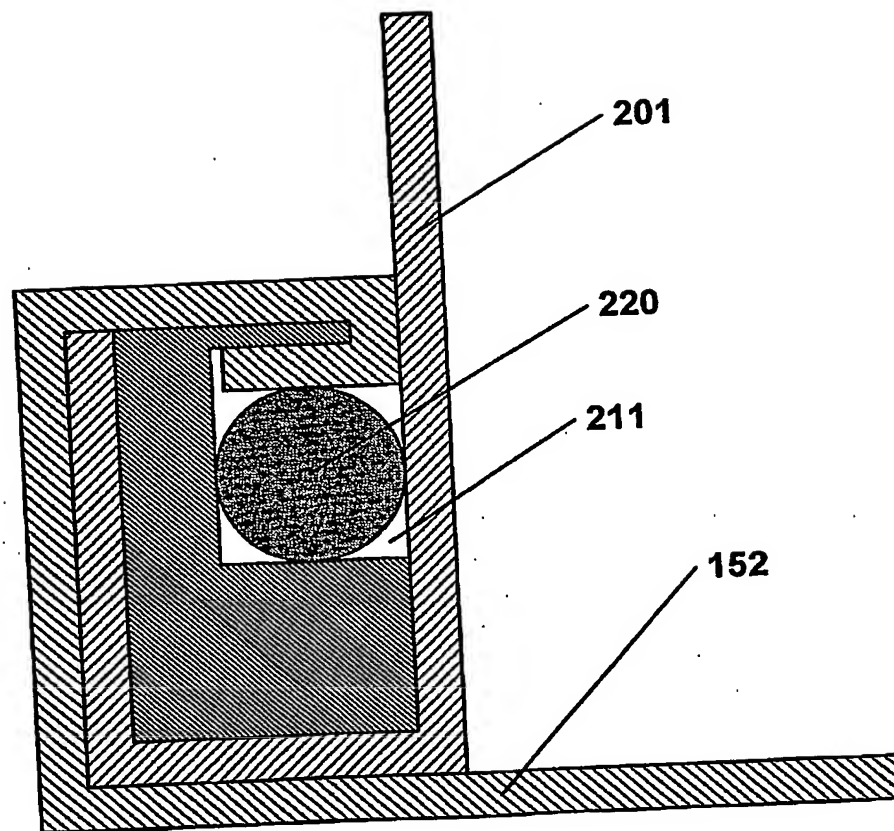


Figure 4

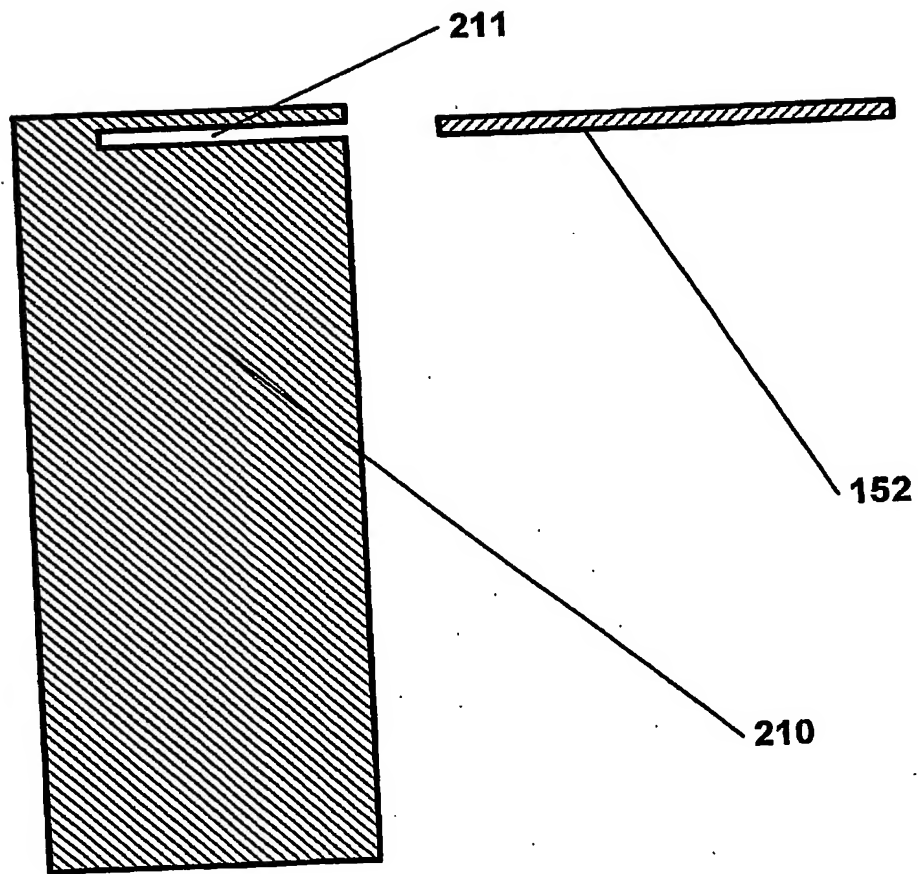


Figure 5

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